respectfully submits that there is no suggestion or motivation to combine the teaching Lee, a surface audio cable, with the teaching of the Bowers wireline cable or the drill string acoustic data transmission system taught by Matthews as required to sustain a prima facie case for obviousness.

Applicant brings attention to the Federal Circuit holding that a suggestion, teaching, or motivation to combine prior art references may come from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1125, 56 U.S.P.Q.2D (BNA) 1456 (Fed. Cir. 2000). While the court points out that the suggestion to combine need not be express and may come from the prior art, as filtered through the knowledge of one skilled in the art, Id., *the showing must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not evidence.* Id, emphasis added here.

Cited References

Matthews teaches and acoustic transmitting method of sending a signal through a drill string. There is no mention at all of a cable or wireline, and the purpose of the Matthews disclosure is not directed to cable transmission.

Lee teaches an audio signal cable having twisted cables 12 and 14, each cable comprising a center insulated conductor 16, six insulated conductors 20a-f wrapped around the central conductor 16, and eight bundles of insulated wire strands 24a-h wrapped around the six conductors 20a-f and central conductor 16. Lee further teaches that the diameter of the center conductor 16 is larger than the diameter of the six conductors 20a-f,

and the diameter of the six conductors 20a-f are each larger than the diameter of the eight bundles 24a-h. The purpose of the configuration being to separate an applied audio frequency to have low frequencies (0-300 hertz) transmitted via the central conductor, mid-range frequencies (300-700 hertz) on the six conductors, and frequencies above 700 hertz transmitted on the outer bundles. There is no mention of applicability or usefulness in a well logging cable. Furthermore, the purpose of the Lee teaching is directed toward minimizing distortion, minimizing energy loss, providing multiple gauge conductors for conducting various signal frequency bands, and for minimizing the effect of electromagnetic fields on the signal. There is no stated or implied purpose of increasing the bandwidth of a well logging cable.

Bowers teaches a method of fabricating a load-bearing multi-conductor electrical logging cable. Bowers addresses the problem of capacitance coupling (column 3 lines 41 through 72) by addressing dielectric material between conductors. Bowers, however, does not suggest or imply using a conductor configuration other than the conductor configuration of a standard logging cable.

Independent claim 1 of the present application is directed to a well logging system comprising a downhole well data sensor, a downhole data transmitter, a surface data receiver, and *a data transmission cable linking the transmitter and the receiver, the cable having at least one twisted pair of signal conductors, each of the conductors being separately insulated, an insulation sheath surrounding the twisted pair of conductors and a tensile load carrier surrounding the insulation sheath, the load carrier comprising a sheath of tensile load carrying filaments.*

Independent claim 7 is to a well logging data cable comprising :

(a) a twisted pair of signal conductors, each of the conductors being separately insulated;

(b) an insulation sheath surrounding the twisted pair of conductors; and

(c) a tensile load sheath surrounding the insulation sheath, the tensile load sheath comprising a plurality of filaments.

Independent claim 12 is to a method of transmitting a signal from within a well borehole to a surface location comprising conveying a signal on a data transmission cable..., *the cable having at least one twisted pair of signal conductors, each of the conductors being separately insulated, an insulation sheath surrounding the twisted pair of conductors and a tensile load carrier surrounding the insulation sheath, the load carrier comprising a sheath of tensile load carrying filaments.*

As to these independent claims, Applicant respectfully submits that the examiner has not presented a prima facie case of obviousness, because there is no suggestion or motivation to combine the references. All claims are directed to load-bearing communications cables used in well logging applications, where the cable includes twisted-pair conductors. The present application teaches that the use of the twisted-pair conductors improves bandwidth of the logging cable as compared to standard logging cables.

As noted above, *Matthews* teaches nothing about well logging cables. *Matthews* relates only to acoustic signal transmission in a drill string. Thus, it is improper to use *Matthews* to conclude that the system claim 1 is obvious.

The *Lee* reference does not teach or suggest that the audio cable taught might be used in well logging applications. The Examiner points to the paragraph in *Lee* bridging columns 3 and 4 and asserts that Lee teaches that the cable is for use in any application. The paragraph bridging columns 3 and 4, however, limits the applicability to "any type of application in which it is desired to transfer an electrical between a source and a load with a minimum of aberrations in the signal." *Lee* uses the term "aberrations" in column 1 lines 22-32 to describe a particular problem of signal transmission wherein a signal transmitted through a cable causes magnetic flux energy in the cable. The energy being stored in cable dielectric material and released after a short delay. The released energy causing the aberrations in the main signal and a noise floor. Therefore, the Examiner is reading the bridging paragraph overly broad for combining the teaching with *Bowers*.

Finally, *Bowers* provides no suggestion or motivation for addressing the problem of logging cable bandwidth by changing the configuration or number of cable conductors. *Bowers* only teaches new dielectric material between the conductors and a method of fabricating the logging cables.

Nowhere in *Matthews*, *Lee* or *Bowers* is there a clear and particular suggestion or motivation to combine the references to meet the purposes of the present invention contemplated by the independent claims. And the Examiner has provided nothing beyond the references to provide the clarity or the particularity as required by Brown & Williamson Tobacco Corp. v. Philip Morris Inc. Therefore, Applicant submits that the Examiner has not presented a prima facie case of obviousness and that the claims are allowable over the cited art.

All other claims dependent from respective independent claims already discussed here, and are allowable for at least the same reasons. As to claim 11, the Examiner asserts that the claim is obvious because one skilled in the art could achieve a cable having the claimed capacitance simply through design experiment. The Examiner does not offer any explanation as to how the conclusion was reached or how one would go about the task of setting up such a design experiment. Therefore, Applicant further submits that the Examiner has not met the burden to show prima facie obviousness as to claim 11.

Secondary Factors

Assuming for the sake of argument that the Examiner has presented a prima facie case of obviousness, Applicant submits that the enclosed Declaration of Raman Viswanathan (the Declaration), provides secondary factors sufficient to rebut obviousness. The Declaration provides evidence that 1) others have tried and failed to produce an improved bandwidth logging cable and 2) that the cable of the present invention provides unexpected results.

The declaration points out that others in the logging industry have addressed the issue of bandwidth. In particular a logging cable known as a triax cable has been introduced to provide better bandwidth than a typical multi-conductor logging cable and to comply with regulations that the typical coaxial cable cannot meet. The triax cable, however appears to lack the bandwidth capabilities provided by the twisted-pair configuration of the present invention. See paragraphs IX-X. Therefore, Applicant respectfully submits that others have tried to address logging cable bandwidth and have

failed to produce a logging cable with the bandwidth of a cable according to the present invention.

Applicant further submits that the resultant bandwidth of a cable according to the present invention are unexpectedly high. As noted in the Declaration and in the present application, the capacitance of the twisted-pair logging cable is at least four times better than coaxial and multi-conductor cables. Moreover, the Declaration points out that the bandwidth improvement is unexpectedly high, because a standard cable wraps conductors about a center conductor. Any outer conductor wraps about the center conductor, and one would expect an effect somewhat less effective but relatively close to a twisted pair wire with respect to bandwidth. See paragraphs XI-XII. Consequently, Applicant respectfully submits that bandwidth improvement in a well logging cable according to the present is unexpectedly high.

CONCLUSION

For all of the foregoing reasons, applicant submits that the claims are allowable over the prior art of record. The Commissioner is hereby authorized to charge the fee due for this response and to credit any overpayment to Deposit Account No. 02-0439 (664-23196-US).

Respectfully submitted,

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